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RESEARCH ARTICLE

FETAL OUTCOMES IN MOTHERS PRESENTING IN FIRST STAGE COMPARED TO SECOND STAGE OF LABOUR AT KAKAMEGA COUNTY GENERAL HOSPITAL.

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Abstract

Globally, many women and newborn die or develop long-term disabilities due to complication of labour and delivery. Second stage admission is more often associated with maternal and fetal morbidity and mortality. The aim of this study was to compare the fetal outcomes among mothers presenting in first Stage of labour and those that present in the second stage of labour at Kakamega county Referral hospital. A quantitative, cross sectional study was conducted. Systematic sampling technique was used to recruit the participants. Data was collected using a pre-tested structured questionnaire administered to 640 mothers in labour; half in first stage and another half in second stage of labor. Data was coded and analyzed using Statistical Package for Social Sciences (SPSS) version 20. Chi-square test and multiple logistic regressions were employed in the analysis. A $p < 0.05$ was considered significant at 95% confidence interval. Null hypothesis was tested at 5% significance level. The study revealed that mothers presenting in first stage of labour had higher chances of normal labour compared to those presenting in second stage of labour ($df=1$, $\chi^2=46$, $p<0.0001$). Most of neonates born by mothers who presented in second stage of labour had low apgar score and were admitted to NBU (15.6%) compared with 1.6% of neonates born to mothers who were admitted in first stage of labour. In conclusion the study found out that most of mothers presenting in second stage of labour were primary school leavers and housewives with no formal employment. Majority of mothers who presented in first stage had normal labor, gave birth to normal neonates with an APGAR score above 7 compared as opposed to those who presented in second stage of labour. For the wellbeing of the neonates and mothers, labour needs to be monitored and delivery conducted by skilled personnel. Therefore, mothers should be sensitized during antenatal visit on birth preparedness and importance of presenting to hospital in first stage of labour for delivery.

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Introduction:-

The intent of maternal care is to ensure the delivery of a healthy baby to a healthy mother (Say *et al.*, 2014). Globally, many women and newborn die or develop long term disabilities due to complication of labour and delivery. The burden of maternal health is one maternal death per minute and from this, developing countries accounts for 99% of maternal deaths (WHO, 2014, Story, 2012). Contributing factor to these mortalities is delay of mothers to access health facility for delivery during labour. The hospital environment is considered to be ideal place for labour and delivery due to the presence of midwives, other qualified health workers and equipments or machines that can be used for intrapartum care (Eryilmaz *et al.*, 2013, Pacagnella *et al.*, 2014). This could allow early identification of maternal and fetal complications and actions can be taken. However, these can only be achieved if the labouring mother presents to the labour ward during First Stage and submits to care of midwife and other health care workers. The midwives and other health care staffs are therefore responsible in assuring good maternal and neonatal outcome (Bako *et al.*, 2013).

Vaginal delivery is not the fundamental goal of good obstetric care but good maternal and fetal outcomes is important. Mode of delivery cannot influence maternal and fetal outcomes if it is timely and correctly done. In addition, maternal and fetal monitoring with partograph would lead to early detection of conditions that militate against normal vaginal delivery, and thereby offer early and useful interventions (Maanongun *et al.*, 2016; Hart *et al.*, 2013).

Normal labour though a continuous process has been divided into three stages. The first stage of labour is the interval between the onset of true labour to the fully dilatation of the cervix, the Second Stage of labour is the interval between fully dilatation of the cervix to delivery of the neonate and the third stage of labour is the period between the delivery of the baby and the expulsion of the placenta (Cheng *et al.*, 2012). Complications can occur at any stage of labour and have been associated with the power (uterine contractions and maternal expulsive efforts); the passenger (fetus) and the passage (the pelvis). One of the complications may occur or in combination (Cheng *et al.*, 2012, Chuma *et al.*, 2013). It is important that mothers should avail themselves to receive proper intra partum care for all the three stages of labour.

The decision of the mother on the place of delivery is influenced by several factors. Feeling of being safe in a familiar environment, comfortable home environment and assistance of the relatives may provide some women with a more physiological support in the home than a hospital birth. In addition, the distance of the hospital from their homes, lack of finances, delay in referral, and absence of the husband at home are also factors involved in delaying getting to the hospital. Complications of these mothers are usually associated to their late presentation and lack of foetal monitoring in the first stage of labour (Bako *et al.*, 2013, Pacagnella *et al.*, 2014).

A mother presenting in second stage of labour does not gain much from intra partum care, having received no expert monitoring during the first stage of labour. It has been observed that, antenatal care has led to a remarkable reduction in maternal and perinatal complications; however, these benefits may not be maximal if women do not receive proper intra partum care (Maanongun *et al.*, 2016; Bako *et al.*, 2013).

There has been no similar evaluation of these groups of mothers in Kakamega County General Hospital, yet daily midwives and other medical staffs encounter difficulties of providing urgent services to mothers presenting in the second stage of labour. This study is designed to examine the birth outcomes in mothers that present in the second Stage of compared to mothers that present in the first stage of labour.

Methodology:-**Study Design**

This was a cross-sectional study which was conducted from 1st February, to 30th April 2017

Study Area

The study was conducted in the Kakamega County Hospital, maternity unit. It is the largest referral hospital in the County and serves twelve sub-county hospitals with highest admission of mothers in labour. It is located along Kisumu - Kakamega Highway. The hospital has a bed capacity of 640 with 89 cots and serves approximately 16000 in-patients annually. Its maternity unit has 6 departments, namely; antenatal ward, labour ward, postnatal ward, nursery, maternity theatre, and gynaecology ward. Labour ward attends to approximately 600 deliveries in a month. The unit has around 62 qualified midwives.

Study Population

The study population comprised all mothers who delivered in maternity during the study period, and met the criteria for inclusion into the study.

Inclusion Criteria

The study population included all consenting mothers in first and second stage of labour with singleton term pregnancies with cephalic presentation and who delivered in the hospital between 1st February, to 30th April 2017.

Exclusion Criteria

Mothers who had previous caesarian delivery, abnormal placentation, antepartumhaemorrhage or any other complication observed during antenatal care or labour were excluded. Those who met the inclusion criteria but declined to participate in the study were also excluded.

Sampling Procedure

Systematic sampling was used to select the mothers presenting in first and second stage of labour every third mother who met the inclusion criteria was chosen to be included in the study both for mothers who presented in first stage and second stage of labour.

Data Collection

Interviewer administered structured questionnaires were used to collect quantitative data. The tool used was adapted with modification from Chuma et al., 2013, maternal and fetal outcome of low risk women presenting in latent phase compared to those presenting in active phase of labour in Bugando, Tanzania. The information collected included Socio demographic data, maternal complications, previous obstetric history, fetal outcomes, antenatal history and reasons why mothers present in first and second stage of labour data.

Data management and statistical analysis

Raw data collected was analysed by assigning numerical values to each response and entering into a coding table. Thereafter the numerical numbers representing responses from the questionnaires was transferred to a code sheet to obtain quantitative results from the closed-ended questionnaires. Management of data was done using a software package SPSS 20.0. Chi-square test and multiple logistic regressions were employed in the analysis. Statistical significance level was set at $p \leq 0.05$.

Ethical considerations

Approval to carry out this study was obtained from the Masinde Muliro University of Science and Technology. In addition, permission was acquired from Nursing Research and Ethical Review Committees of Kakamega County Hospital. Permission to conduct research was sought from National Commission for Science Technology and Innovation (NACOSTI).

The respondents were educated on their rights in the study. The purpose of the study, any foreseen risks, and guarantee of anonymity, benefits and compensation or lack of them were explained to the respondents for them to participate willingly in the study. The participants were asked of their free will to take part in the research without forcing or coercing them after being informed of the purpose of the inquiry. Oral and written Consent were obtained and documented from all the study subjects prior to the interview. The respondents were assured that their participation was voluntary and that the data were handled in a confidential manner, their names were not be used in any publication or presentation. All mothers have equal chances to be selected to the study. The information given by the respondents were kept confidential and anonymous. Those who opted out did so without loss of any benefits or intrapartum care. The research obtained results which did not affect them directly or indirectly. The respondents were free to ask questions for clarification where necessary and privacy was maintained.

The results from the study were revealed and disseminated transparently despite the outcome of the research. The researcher provided feedback to the MOH and MMUST, while the information obtained from interviews and records were treated as confidential

Results:-

A total of 640 respondents consented and participated in the study, 50% of which were mothers who were admitted in first stage and another 50% in second stage of labour. As presented in Table 1, most of the mothers admitted in Stage 1 (58.4%), and Stage 2 (67.0%) were aged 30 – 39 years. The mean age for mothers reporting in Stage 1 (33.2 ± 5.8) was comparable with those who reported in Stage 2 (33.2 ± 5.2). There was no significant difference between the two mean ages ($t = -0.09$; $df = 638$; $p = 0.9$). There was no association between stage of labour and age groups ($p = 0.14$). The difference in level of education between the two groups was statistically significant ($p < 0.0001$). There was significant association between stage of labour and mother's occupation ($p < 0.0001$). A significantly higher proportion of women reporting in Stage 2 (98.4%) were housewives compared to 38.1% in Stage 1. On the contrary, a higher proportion of women in Stage 1 (17.8%) were formally employed unlike their counterparts in Stage 2 (0.3%).

Table 1:-Socio-demographic characteristics

Variable	Category	Stage 1		Stage 2		p value
		N	%	N	%	
Age group in years	20 – 24	16	5.1	11	3.5	0.14
	25 – 29	67	21.1	59	18.6	
	30 – 34	94	29.6	120	37.7	
	35 – 39	91	28.7	93	29.3	
	>=40	52	16.3	37	11.6	
	Total	320	100.0	320	100.0	
Mean \pm SD (Range)		33.2 \pm 5.8 (17.0 – 46.0)		33.2 \pm 5.2 (18.0 – 45.0)		t= -0.09; df=638 p=0.9
Marital status	Single	36	11.3	42	13.1	0.8
	Married	234	73.1	225	70.3	
	Separated	26	8.1	24	7.5	
	Widow	15	4.7	16	5.0	
	Divorced	9	2.8	13	4.1	
	Total	320	100.0	320	100.0	
Level of education	None	0	6.3	19	5.9	<0.0001
	Primary	13	4.1	291	90.9	
	Secondary	195	60.9	7	2.2	
	Tertiary	112	35.0	3	0.9	
	Total	320	100.0	320	100.0	
Religion	Catholic	21	6.6	24	7.5	0.5
	Protestant	285	89.1	288	90.0	
	Muslim	7	2.2	3	0.9	
	Atheist	7	2.2	5	1.6	
	Total	320	100.0	320	100.0	
Occupation	Housewife	122	38.1	315	98.4	<0.0001
	Farmer	56	17.5	1	0.3	
	Employed	57	17.8	1	0.3	
	Business	85	26.6	3	0.9	
	Total	320	320	320	100.0	

Fetal outcome among mothers who came in first stage and second stage during delivery at KCGH.

Neonatal outcomes

Table 2 shows neonatal outcomes for mothers who reported in Stage 1 and those who reported in Stage 2. APGAR score was recorded after 1 and 5 minutes. Nearly all the neonates whose mothers reported in Stage 1 had higher APGAR score after 1 min (99.7%) and after 5 min (99.1%). A comparatively lower proportion of those who reported in Stage 2 posted similar scores after 1 min (91.9%) and after 5 min (83.7%). Although small in number, mothers who came in Stage 2 had more cases of stillbirth (2.2%) than those who came in Stage 1. Again, a higher proportion of those reporting in Stage 2 (15.6%) had their neonates admitted in NBU compared to those who came

in Stage 1 (1.6%). Most of the neonates of mothers who came in Stage 2 and admitted in NBU had low APGAR Score (58%).

Table 2:-Neonatal outcomes

Monitored parameters	Categories	Stage 1		Stage 2	
		n=320	%	n=320	%
APGAR Score after 1 min	Less than 7	1	0.3	26	8.1
	≥ 7	319	99.7	294	91.9
APGAR Score after 5 min	Less than 7	3	0.9	52	16.3
	≥ 7	317	99.1	268	83.7
Stillbirth	Yes	0	0.0	7	2.2
	No	320	100.0	313	97.8
Admitted NBU	Yes	5	1.6	50	15.6
	No	315	98.4	270	84.4
Reasons for admission in NBU	Low APGAR Score	2	40.0	29	58.0
	Respiratory distress syndrome	2	40.0	17	34.0
	Congenital abnormality	1	20.0	4	8.0

Maternal factors associated with baby being admitted in NBU

Investigations on maternal factors associated with baby being admitted in NBU were conducted. Stage of labour was highly associated with the chances of a baby being admitted in NBU or not. Babies of mothers who came in Stage 1 were less likely to be admitted in NBU (OR: 0.1; 95% CI: 0.02 – 0.2; $p < 0.0001$) unlike their colleagues who reported in Stage 2. Significant relationship was also found between those who had had less than four ANC visits and those with more than 4 visits. A significantly smaller proportion of those who had less than 4 visits had their babies admitted (OR: 0.5; 95% CI: 0.2 – 0.9; $p=0.02$). Again, a significantly smaller proportion of babies whose mothers came in Stage 1 were admitted (OR: 0.3; 95% CI: 0.1 – 0.8; $p=0.02$). On the contrary, health care worker who conducted delivery had no significant association with the baby being admitted in NBU ($p=0.22$).

Table 3:-Logistic regression model of association between maternal factors and baby being admitted in NBU

Variables	Effect	OR	95% CI	p value*
Stage of labour	1 st vs 2 nd stage of labour	0.1	0.02 – 0.2	<0.0001
Number of ANC visits	Less than 4 vs More than 4	0.5	0.2 – 0.9	0.02
Mode of delivery	SVD vs others	0.3	0.1 – 0.8	0.02
Who conducted delivery	Midwife vs others	0.6	0.2 – 1.4	0.22

Significant if p value < 0.05

Discussions:-

Socio-demographic characteristics

Mothers who presented in first stage of labour (58.4%) and second stage (67.0%) were aged 30 – 39 years; this meant that primigravidas and grandmultiparas were within age bracket of 30-39 years for both groups. Maternal age, marital status and religion did not influence the labour outcome. The findings are consistent with previous studies in the general population-investigating mothers presenting early and late in labour (Maanongun et al., 2016, Bako et al., 2013). The study also found out that mothers who presented in second stage of labour had attained primary or no education and they were housewives ($p < 0.0001$). Due to lack of primary level of education among these mothers presenting in second stage of labour, most of them had no formal employment ($p < 0.0001$) hence there is lack of facilitation to hospital early in labour since they depend on others in decision making and financial support. These findings are at variance with previous studies (Maanongun et al., 2016, Bako et al., 2013) where educational level and employment did not influence their presentation in labour

Fetal outcome among mothers admitted in Second Stage and First Stage of labour during delivery at KCGH.

There was significant association in the study between presentation in second stage and the risk of having adverse neonatal outcomes. At first minute (8.1% $n=26$) and fifth minute (16.3% $n=52$) Apgar score was less than 7 among

the second stage group compared to first minute (0.3% n= 1) and fifth minute (0.9% n=3) Apgar score among the first stage group. (though this is also dependent on good resuscitation), however, because this was always done by the trained health care team, it may reflect the events of labour. There were also cases of still births and neonatal deaths and the need for New born Care Unit admissions among the second stage admission group than the first stage group (OR: 0.1; p <0.0001). These results are in contrast with previous studies by Bako et al. in Borno, Nigeria and Chuma et al in Bugando, Tanzania (Bako et al.,2013, Chuma et al 2013) that found no difference between the two groups. It agrees with other studies by Maanongun et al.,2016 , Tanwira (2011), Sinhg, (2010) and Eryilmaz et al., (2013).This may be attributed to mothers labouring for long at home before presenting to labour ward, hence exposing their fetuses to the complications at birth and even death. The findings in this study, therefore, suggest that many of these women must have been in the second stage of labour for some time before presenting to the labour ward.

Mothers who had less than four antenatal visits and from second stage group had their neonates admitted to NBU (OR: 0.5; p=0.02) due to low APGAR scores. On the contrary, who conducted delivery had no significant association with the neonate being admitted in NBU (p=0.22).

Conclusion:-

Most of mothers presenting in second stage of labour were primary school leavers and housewives with no formal employment. The unemployment nature of these mothers may have interfered with decision making to present early in labour and lack of finances or fare to facilitate them to health facility early. It was also noted that mothers whose spouses decided for them to attend ANC completed the 4 visit and presented early in labour. These mothers might have benefitted from health talks during antenatal clinic visits.

The neonates whose mothers were admitted in second stage of labour had lower APGAR score and most of them were admitted to NBU and also had cases of stillbirth. For the wellbeing of the neonates, the labouring mother needs to be monitored in the hospital setting

Recommendation:-

1. Birth preparedness and symptoms of labour should be enhanced in antenatal health talks to reduce the late presentation during labour
2. The spouse and the key family members should be involved and educated on the advantages of presenting early to hospital for delivery.

Foot note:

Competing Interests:

The authors have declared that no competing interests exist.

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